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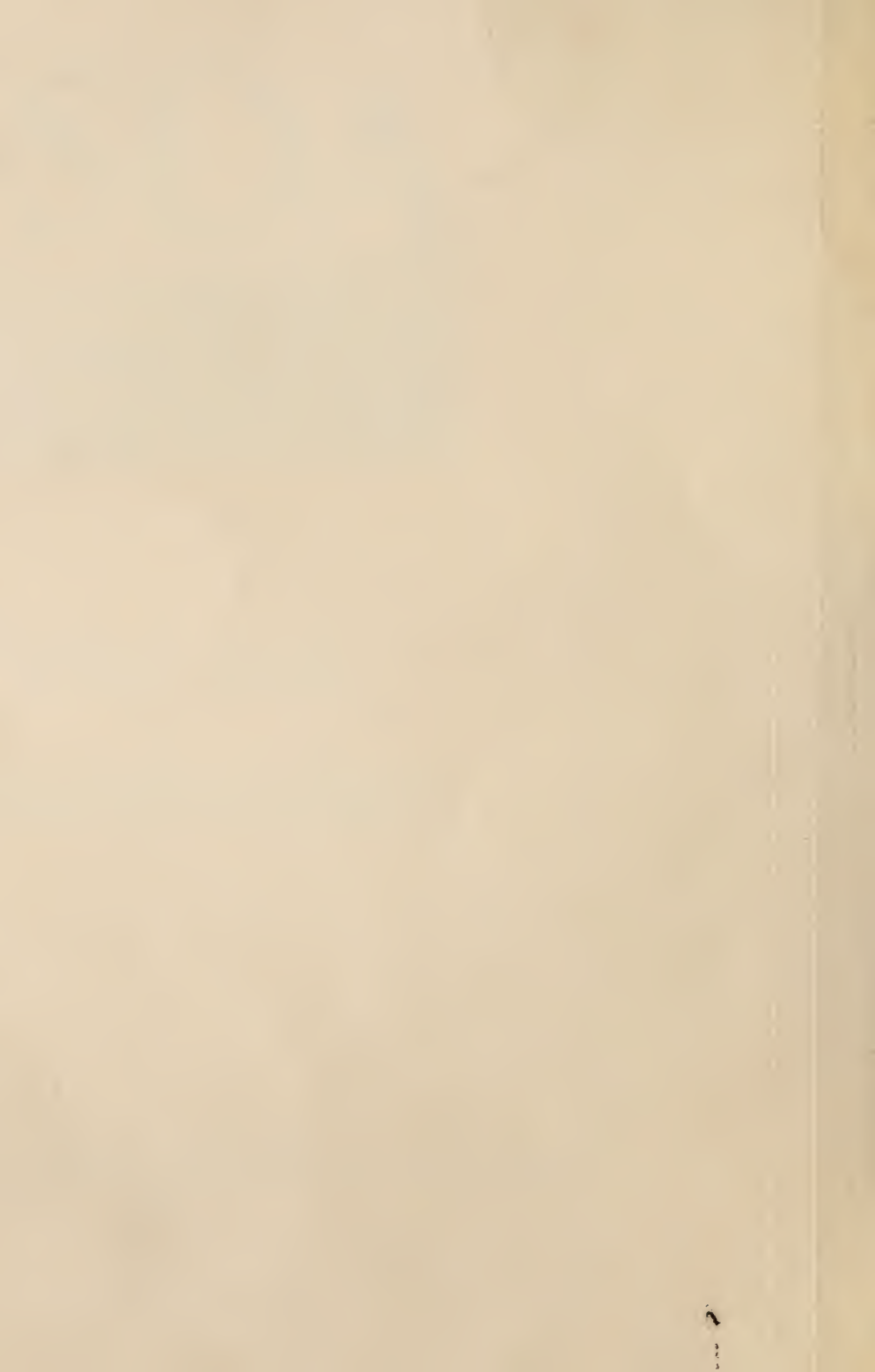
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TIMBER PRODUCTS PRODUCTION
in West Virginia
1965

The Authors

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**by Neal P. Kingsley
and David R. Dickson**

Contents

Foreword

THIS study was funded through the Appalachian Regional Development Act of 1965 and was conducted by the Forest Survey Project of the Northeastern Forest Experiment Station with the assistance of the State Forester and the Extension Forester of West Virginia, and the Monongahela Power Company. The State Forester's office and the Extension Forester provided lists of wood-using industries in the State, and the Monongahela Power Company assisted in the field follow-up of nonrespondents to the mail canvass.

Making a Comeback

IN 1909 WEST VIRGINIA led the Nation in timber production. Since then West Virginia's position has slipped. The State's forests could not long sustain such heavy cutting; therefore many of the large sawmills either closed down, reduced their operations, or moved out of State. All the woodpulp mills either discontinued operations or moved out of the State. Today the State's forest industries are characterized by small operations; and in 1962 West Virginia ranked twenty-fifth among the states in the output of roundwood products.

Since the period of heavy cutting in the late 1800's and early 1900's, West Virginia's forest resource has made an impressive comeback. Today wood in West Virginia is growing about twice as fast as it is being cut. According to the 1961 forest survey of West Virginia,[1] the annual growth of growing stock[2] in the State totaled 370 million cubic feet while timber cut totaled 119 million cubic feet. More than 1 billion board feet of sawtimber is being added to the resource each year while less than $\frac{1}{2}$ billion is being removed.

This lower level of cutting, a rapid rate of farm abandonment with a consequent increase in forest acreage, and the widening application of forest-management practices have rejuvenated the State's forest resource. Thus today the average timber stand in West Virginia is young and vigorous.

Where once the overriding issue for those concerned with West Virginia's forest resource was timber supply, now, because the supply of timber is increasing, attention is shifting to problems of forest-products production and timber demand. Therefore in 1966 we conducted a study to provide as detailed information as possible about the timber-products output of West Virginia in 1965. This information should prove valuable in projecting timber demand and in locating available supplies of

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[1] Ferguson, Roland H. THE TIMBER RESOURCES OF WEST VIRGINIA. U. S. Forest Serv. Resource Bull. NE-2. 123 pp., illus. NE. Forest Exp. Sta., Upper Darby, Pa. 1964.

[2] See appendix for definitions of this term and other terms used in this report.

primary forest products. This report assesses the production of forest products and the level of the timber harvest in 1965.

Wherever possible we have tried to present as detailed data as possible. For those products for which county data are both available and meaningful, county estimates have been presented. However, other products are best presented on a regional or statewide basis.

To facilitate comparison with the 1961 West Virginia Timber Resource Report,[1] the State has been divided into three geographic units (fig. 1). These units generally correspond to the Northeastern, Southern, and Northwestern geographic strata presented in the forest-survey report. To provide finer breakdowns, these units have been further divided into subunits, with two subunits to each unit. The subunits are approximately equal in total area and each consists of 7 to 12 counties.
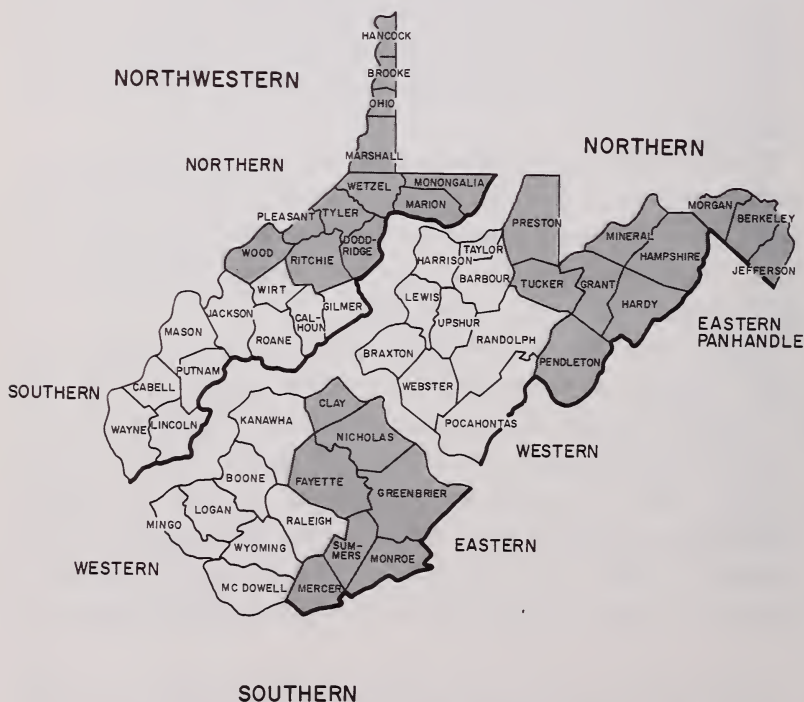

Figure 1.—The geographic units and subunits in West Virginia.

Total Production & Economic Importance

In 1965 timber-products output totaled 154 million cubic feet (table 1). Ninety-one percent of this material was hardwood, and 9 percent was softwood. Not all of these products were produced from roundwood: 18 million feet was produced from the byproducts of other wood-using industries. Most of these byproducts were sawmill slabs and edgings that either were chipped for pulpwood and other fiber products, or were sold or given away as fuelwood.

Sawlogs accounted for 55 percent—84.5 million cubic feet—of all products. Pulpwood was the second most important product —35 million cubic feet—nearly 23 percent of the total output of timber products. Fuelwood was the third most important product with a total of 12 million cubic feet. However, nearly two-thirds of the fuelwood was produced from other wood-industry byproducts, primarily from sawmill slabs and edgings. Somewhat surprisingly, mine timbers ranked fourth with 11 million cubic feet. Despite the prevalence of roof-bolting in deep mines and the large increase in the amount of coal produced from strip mines, mine timbers are still an important product in mining regions.

These four products—sawlogs, pulpwood, fuelwood, and mine timbers—accounted for 93 percent of the total timber-products produced in West Virginia in 1965. The remaining 7 percent included varied products like veneer logs, cooperage bolts, charcoal wood, rustic fencing, turned products, posts, and poles.

By comparison, 1965 was a substantially better year for wood-products producers than was 1960. Total production in 1965 was more than 18 percent above the 1960 production of 130 million cubic feet.[3] All products, with a few minor exceptions, increased from the 1960 levels. Sawlog production was up nearly 47 percent, and pulpwood production was up nearly 38 percent from

[3] For a discussion of timber products production in West Virginia in 1960 see: Ferguson, Roland H., THE TIMBER RESOURCES OF WEST VIRGINIA, U. S. Forest Serv. Resource Bull. NE-2, pages 13 and 14, and table 28, page 56. 1964.

Table 1. — *Output of timber products, by source of material and softwoods and hardwoods, West Virginia, 1965*

Product and species group	Standard units	Total output		Roundwood products		Plant byproducts	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Sawlogs:							
Softwoods	M board feet[1]	20,224	3,584	20,224	3,584	—	—
Hardwoods	M board feet[1]	470,494	80,871	470,494	80,871	—	—
Total	M board feet[1]	490,718	84,455	490,718	84,455	—	—
Veneer logs and bolts:							
Softwoods	M board feet	—	—	—	—	—	—
Hardwoods	M board feet	4,601	791	4,601	791	—	—
Total	M board feet	4,601	791	4,601	791	—	—
Cooperage:							
Softwoods	M board feet	—	—	—	—	—	—
Hardwoods	M board feet	4,426	761	4,426	761	—	—
Total	M board feet	4,426	761	4,426	761	—	—
Pulpwood:							
Softwoods	Standard cords[2]	102,600	8,722	102,300	8,696	300	26
Hardwoods	Standard cords[2]	309,100	26,273	217,000	18,445	92,100	7,828
Total	Standard cords[2]	411,700	34,995	319,300	27,141	92,400	7,854
Poles:							
Softwoods	M pieces	1	12	1	12	—	—
Hardwoods	M pieces	—	—	—	—	—	—
Total	M pieces	1	12	1	12	—	—

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Product / species group	Unit						
Mine timbers (Round and split)							
Softwoods	M cubic feet	898	898	898	898	—	—
Hardwoods	M cubic feet	10,114	10,114	10,114	10,114	—	—
Totals	M cubic feet	11,012	11,012	11,012	11,012	—	—
Charcoal:							
Softwoods	Standard cords	—	—	—	—	—	—
Hardwoods	Standard cords	76,800	6,144	62,300	4,984	14,500	1,160
Total	Standard cords	76,800	6,144	62,300	4,984	14,500	1,160
Posts (Round and split)							
Softwoods	M pieces	18	28	18	28	—	—
Hardwoods	M pieces	1,881	2,641	1,881	2,641	—	—
Total	M pieces	1,899	2,669	1,899	2,669	—	—
Fuelwood:							
Softwoods	Standard cords	6,329	506	2,591	207	3,738	299
Hardwoods	Standard cords	149,799	11,984	52,779	4,222	97,020	7,762
Total	Standard cords	156,128	12,490	55,370	4,429	100,758	8,061
Miscellaneous:[3]							
Softwoods	M cubic feet	—	—	—	—	—	—
Hardwoods	M cubic feet	1,031	1,031	161	161	870	870
Total	M cubic feet	1,031	1,031	161	161	870	870
All products:							
Softwoods	M cubic feet	—	13,750	—	13,426	—	325
Hardwoods	M cubic feet	—	140,610	—	122,990	—	17,620
Total	M cubic feet	—	154,360	—	136,415	—	17,945[4]

[1] International ¼-inch rule.
[2] Rough wood basis (chips converted to equivalent standard cords).
[3] Includes hewn ties, excelsior bolts, shingle bolts, turnery bolts, chemical wood, and the like.
[4] Does not include 624 thousand cubic feet of plant byproducts used for agricultural bedding, mulch, etc.

1960. The production of veneer logs and cooperage bolts in 1965 was more than double the 1960 production.

The Growing Stock

In 1965 growing-stock material accounted for 85 percent of the total output of timber products. Among the products the percent of output from growing stock ranged from a low of only 18 percent for fuelwood to a high of 100 percent for veneer logs and cooperage bolts (table 2).

All usable or growing-stock volume of cut trees does not necessarily become timber products. Some wood often is left as woods residue because market demands or other factors do not permit removing this material. However, in some cases more material may be removed than is considered growing stock. But generally more growing stock is cut than is used for timber products. In 1965 West Virginia produced 131 million cubic feet of timber products from 176 million cubic feet of growing stock that was cut. Thus about 34 percent more growing stock was cut than became timber products (table 3).

Wood-Industry Residues

The wood-products industries, like most manufacturing industries, produce residues or byproducts. In the wood-products industries these residues are sawmill slabs and edgings, sawdust, shavings, veneer cores, and the like. In recent years interest has increased in the utilization of these residues for the manufacture of other wood products. For example, the use of chipped sawmill waste in the manufacture of woodpulp has grown phenomenally in recent years. In 1965 the equivalent of 92 thousand cords of round pulpwood, or 22 percent of the total pulpwood production in West Virginia, was produced from sawmill waste. By comparison, in 1963 the production of pulpwood from sawmill residues totaled only 39 thousand cords.

In addition to the 92 thousand cords of wood chips for pulpwood, an additional 85.6 thousand cords (10.7 million cubic feet) of byproducts was utilized for both industrial and domestic fuel, agricultural mulch and bedding, metalurgical chips, wedges, and many other products (table 4).

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Table 2.— Output of roundwood products by source, and softwoods and hardwoods, West Virginia, 1965

(Thousand cubic feet)

Product and species group	All sources	Growing-stock trees[1]			Cull trees	Salvable dead trees	Other sources
		Total	Sawtimber	Poletimber			
Sawlogs:							
Softwoods	3,584	3,584	3,579	5	—	—	—
Hardwoods	80,871	79,855	77,639	2,216	695	321	—
Total	84,455	83,439	81,218	2,221	695	321	—
Veneer logs and bolts:							
Softwoods	—	—	—	—	—	—	—
Hardwoods	791	791	791	—	—	—	—
Total	791	791	791	—	—	—	—
Cooperage:							
Softwoods	—	—	—	—	—	—	—
Hardwoods	761	761	761	—	—	—	—
Total	761	761	761	—	—	—	—
Pulpwood:							
Softwoods	8,696	8,552	6,975	1,577	—	—	144
Hardwoods	18,445	18,020	10,324	7,696	128	187	110
Total	27,141	26,572	17,299	9,273	128	187	254
Poles:							
Softwoods	12	11	9	2	—	—	1
Hardwoods	—	—	—	—	—	—	—
Total	12	11	9	2	—	—	1

Table 2. — (Continued)

Product and species group	All sources	Growing-stock trees[1]			Cull trees	Salvable dead trees	Other sources
		Total	Sawtimber	Poletimber			
Mine timbers (Round and split):							
Softwoods	898	898	709	189	—	—	—
Hardwoods	10,114	9,912	5,650	4,262	61	91	50
Total	11,012	10,810	6,359	4,451	61	91	50
Charcoal:							
Softwoods	—	—	—	—	—	—	—
Hardwoods	4,984	4,884	2,784	2,100	45	15	40
Total	4,984	4,884	2,784	2,100	45	15	40
Posts (Round and Split):							
Softwoods	28	28	4	24	—	—	—
Hardwoods	2,641	1,769	566	1,203	185	660	27
Total	2,669	1,797	570	1,227	185	660	27
Fuelwood:							
Softwoods	207	104	75	29	—	19	84
Hardwoods	4,222	2,142	1,066	1,076	649	599	832
Total	4,429	2,246	1,141	1,105	649	618	916
Miscellaneous:							
Softwoods	—	—	—	—	—	—	—
Hardwoods	161	156	90	66	1	2	2
Total	161	156	90	66	1	2	2
All products:							
Softwoods	13,425	13,177	11,351	1,826	—	19	229
Hardwoods	122,990	118,290	99,671	18,619	1,764	1,875	1,061
Total	136,415	131,467	111,022	20,445	1,764	1,894	1,290

Table 3. — *Timber cut from growing stock on commercial forest land by products and logging residues, and by softwoods and hardwoods, West Virginia, 1965*

(Thousand cubic feet)

Item	All species	Softwoods	Hardwoods
Roundwood products:			
Sawlogs	83,439	3,584	79,855
Veneer logs and bolts	791	—	791
Cooperage logs and bolts	761	—	761
Pulpwood	26,572	8,552	18,020
Poles	11	11	—
Mine timbers	10,810	898	9,912
Charcoal	4,884	—	4,884
Posts	1,797	28	1,769
Fuelwood	2,246	104	2,142
Miscellaneous	156	—	156
All products	131,467	13,177	118,290
Logging residues	44,821	1,054	43,767
Timber cut	176,288	14,231	162,057

Despite this rapid increase in the use of wood-industry by-products, nearly 18.1 million cubic feet of residues was unused in 1965. Of this total over 10.3 million feet, 82 thousand cords, was suitable for chipping (table 5).

Wood-using Industries' Contribution to the Economy

According to the 1963 Census of Manufacturers, 6.5 percent of West Virginia's labor force is employed in wood-using industries other than the wooden furniture industry.[4] Four and one-half percent of labor force is employed in the primary lumber and wood-products industries, which include logging operations, sawmills, and planing mills. The secondary lumber and wood-products industries, which include those industries that manufacture products from lumber and wood, employ 0.7 percent

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[4] The wood furniture industry has been omitted here because it is a very minor industry in West Virginia, with less than 350 employees.

of the labor force. The remaining 1.3 percent are employed in the pulp, paper, and paperboard industry.

The low percentage employed in the secondary lumber and wood-products industries points out that an overwhelming proportion of the State's primary wood products is shipped out of State for manufacture into a final product. West Virginia could realize a greater return from its timber harvest if more material were shipped out of the State as final products (tables 6 and 7).

Table 4. — *Disposition of wood industry residues produced in West Virginia in 1965 by use, type of material, and by softwoods and hardwoods*

(Thousand cubic feet, solid wood equivalent)

| Type of residues | Total used and unused | Residues used for — | | | | Unused residues[5] |
		Fiber products[1]	Industrial fuel[2]	Domestic fuel[3]	Other uses[4]	
Softwoods:						
Coarse[6]	520	26	72	136	16	270
Fine[7]	341	—	68	23	45	205
Total	861	26	140	159	61	475
Hardwoods:						
Coarse	23,292	7,828	1,314	2,877	1,287	9,986
Fine	12,528	—	3,151	420	1,306	7,651
Total	35,820	7,828	4,465	3,297	2,593	17,637
All species:						
Coarse	23,812	7,854	1,386	3,013	1,303	10,256
Fine	12,869	—	3,219	443	1,351	7,856
Total	36,681	7,854	4,605	3,456	2,654	18,112

[1] Pulpwood chips.
[2] Includes all residues used as fuel by an industrial plant, including the plant at which the residues were produced.
[3] Includes all residues used as domestic fuel whether sold or given away.
[4] Includes livestock bedding, mulch, metallurgical chips, wedges, and other specialty items.
[5] Includes all residues burned or left as waste.
[6] Residues suitable for chipping like slabs and edgings and veneer cores.
[7] Residues not suitable for chipping like sawdust and shavings.

Table 5. — *Volume of unused wood industry residues produced in West Virginia in 1965 by geographic unit and subunit[1], by type of material, and by hardwoods and softwoods*

(Thousand cubic feet, solid wood equivalent)

Geographic unit	All forms			Coarse[2]			Fine[3]		
	Softwood	Hardwood	All species	Softwood	Hardwood	All species	Softwood	Hardwood	All species
Northern:									
Eastern subunit	46	2,187	2,233	26	1,270	1,296	20	917	937
Western subunit	151	5,138	5,289	86	2,986	3,072	65	2,152	2,217
Total	197	7,325	7,522	112	4,256	4,368	85	3,069	3,154
Southern:									
Eastern subunit	166	4,099	4,265	95	2,260	2,355	71	1,839	1,910
Western subunit	71	3,090	3,161	40	1,644	1,684	31	1,446	1,477
Total	237	7,189	7,426	135	3,904	4,039	102	3,285	3,387
Northwestern:									
Northern subunit	10	1,215	1,225	4	714	718	6	501	507
Southern subunit	31	1,908	1,939	19	1,112	1,131	12	796	808
Total	41	3,123	3,164	23	1,826	1,849	18	1,297	1,315
Total, all units	475	17,637	18,112	270	9,986	10,256	205	7,651	7,856

[1] See the explanation of geographic units in the next section of this report.
[2] Residues suitable for chipping like slabs and edgings and veneer cores.
[3] Residues not suitable for chipping like sawdust and shavings.

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Table 6. — *Number of employees, wages and salaries paid, and value added by manufacture in the wood-using industries and in all industries in West Virginia, 1965*

Industry	Number of employees	Wages and salaries paid	Value added by manufacture
All industries	117,026	$698,049,000	$1,887,148,000
(percent)	(100.0)	(100.0)	(100.0)
Primary lumber and wood products	5,236	14,669,000	24,939,000
(percent)	(4.5)	(2.1)	(1.3)
Secondary lumber and wood products	805	2,911,000	4,934,000
(percent)	(.7)	(.4)	(.3)
Pulp, paper, and paperboard	1,545	7,319,000	12,595,000
(percent)	(1.3)	(1.0)	(.7)
All wood-using industries[1]	7,586	24,899,000	42,468,000
(percent)	(6.5)	(3.5)	(2.3)

Source: U. S. Bureau of the Census, 1963 Census of Manufacturers, Publications MC 63(3)-49, MC 63(2)-24A, 24B, 24C, MC 63(2)-26A, 26B, 26C, 2nd MC 63(5)-3.4.
[1] Except wooden furniture.

Table 7. — *Number of employees, wages and salaries paid, and value added by manufacture in the wood-using industries of West Virginia by industry sector and geographic unit, 1965*

Industry Sector	Northern unit		Southern unit		Northwestern unit		Total, all West Virginia
	Eastern Panhandle subunit	Western subunit	Eastern subunit	Western subunit	Northern subunit	Southern subunit	
Primary lumber and wood products							
Number of employees	764	1,293	1,152	1,215	288	524	5,236
Wages and salaries paid	$2,084,000	$3,652,000	$3,212,000	$3,403,000	$ 807,000	$1,511,000	$14,669,000
Value added	$3,766,000	$6,135,000	$5,437,000	$5,786,000	$1,371,000	$2,444,000	$24,939,000
Secondary lumber and wood products							
Number of employees	117	254	111	17	68	238	805
Wages and salaries paid	$ 413,000	$ 932,000	$ 428,000	$ 52,000	$ 201,000	$ 885,000	$ 2,911,000
Value added	$ 706,000	$1,574,000	$ 745,000	$ 108,000	$ 316,000	$1,485,000	$ 4,934,000
Pulp, paper, and paperboard							
Number of employees	375	6	—	181	949	34	1,545
Wages and salaries paid	$1,896,000	$ 29,000	—	$ 864,000	$4,340,000	$ 190,000	$ 7,319,000
Value added	$4,320,000	50,000	—	$1,260,000	$6,499,000	$ 466,000	$12,595,000
Total, all wood industries (except wooden furniture)							
Number of employees	1,256	1,553	1,263	1,413	1,305	796	7,586
Wages and salaries paid	$4,393,000	$4,613,000	$3,640,000	$4,319,000	$5,348,000	$2,586,000	$24,899,000
Value added	$8,792,000	$7,759,000	$6,182,000	$7,154,000	$8,186,000	$4,395,000	$42,468,000

Source: U. S. Bureau of the Census, 1963 Census of Manufactures, Publications MC 63(3)-49, MC 63(2)-24A, 24B, 24C, MC 63(2)-26A, 26B, 26C, and MC 63(5)-3.4.

Output of Timber Products

SAWLOGS

Lumber Production

No one really knows when the first sawmill appeared in what is now West Virginia. By 1755 there were a few water-powered sawmills in the valleys of the Potomac and its tributaries. The first sawmill west of the Alleghenies, built at St. George in Tucker County in 1776 by John Minear, was a water-powered sash or "gate" mill. It is estimated that by 1835 there were 15 steam-powered circular sawmills in West Virginia (fig. 2).

Thus the lumber industry in West Virginia began somewhat laboriously, but it gained momentum. By 1875 the band saw had arrived and a boom in lumber production followed. The earliest

Figure 2.—West Virginia is a leading producer of hardwood lumber in the Northeast. Here rough hardwood lumber is being air-dried.

Table 8. — *Lumber production, number of sawmills, and average production per mill in West Virginia for selected years, 1869-1965*[1]

Year	Lumber production	Sawmills	Average production per mill
	Thousand board feet	*No.*	*Thousand board feet*
1869	76,375	*	—
1879	180,112	*	—
1889	318,868	*	—
1899	778,051	568	1,370
1909	1,472,942	1,524	966
1914	1,118,480	913	1,225
1916	1,009,156	475	2,125
1919	763,103	736	1,037
1929	632,992	465	1,361
1932	135,283	124	1,091
1939	324,484	407	797
1942	588,456	1,558	378
1946	890,967	*	—
1949	469,383	*	—
1960	323,980	*	—
1965	475,369	505	941

* Not available.
[1] Sources: Steer, Henry B. Lumber Production in the United States, 1799-1946. U. S. Dep. Agr. Misc. Publ. 669. 1948.
Clarkson, Roy B., Tumult on the Mountains, p. 39. McClain Printing Company, Parsons, W. Va. 1964.
Northeastern Forest Experiment Station, Forest Service, U. S. Department of Agriculture, Upper Darby, Pa.

records of lumber production in West Virginia in 1869 show production estimated at 76 million board feet. Thirty years later, 1899, lumber production had increased to over 778 million board feet. In another 10 years West Virginia reached its peak of 1.5 billion feet. The boom was prolonged somewhat by World War I. But after the war a continuing decline in lumber production began. By 1960 lumber production had dropped to 324 million board feet. However, since then lumber production in the State has been increasing until by 1965 it reached 475 million board feet (table 8, fig. 3).
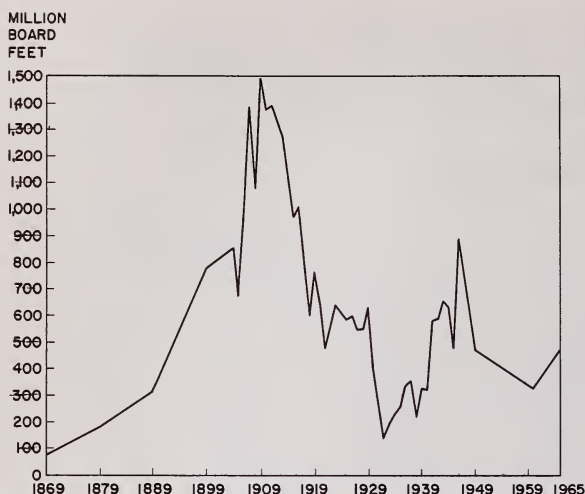
Figure 3 — Lumber pro-
duction in West Virginia
for selected years.

Lumber Production
and Size of Sawmills

In 1965 approximately 505 sawmills were operating in West
Virginia. These mills ranged in size from the smallest, which
produced less than 16 thousand board feet, to the largest, which
produced more than 25 million board feet during the year.

Twenty-six percent of these mills—133—produced more than
1 million board feet each. Their total production amounted to
398 million board feet, or 84 percent of the State's total lumber
production (fig. 4). By comparison, those mills that produced
under 100 thousand board feet accounted for 39 percent of the
State's sawmills, but only 2 percent of its lumber production
(fig. 5).

Table 9 shows the number of mills and the total production,
both numerically and as a percent of the State total, for five
sawmill-size classes, as well as the average production of each
class. The average production of the State's sawmills was 941
thousand board feet in 1965. Note that the 16 largest mills
averaged 10,489 thousand board feet while the 195 smallest
mills averaged only 59 thousand board feet. It is unlikely that
many of the small mills, remnants of earlier periods of high
lumber production, will be replaced as they go out of production.

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Figure 4.—Large sawmills like this one produced 84 percent of West Virginia's lumber production in 1965.

Figure 5.—Small sawmills are common throughout West Virginia. This portable mill is sawing white pine logs.

Table 9. — *Lumber production in West Virginia by sawmill-size class, 1965*

Sawmill-size class (thousand board feet)	Mills		Lumber production		
			Total		Average
	No.	*Percent of total*	*Thousand bd. ft.*	*Percent of total*	*Thousand bd. ft.*
5,000 or more	16	3	167,830	36	10,489
2,500 to 4,999	27	5	91,741	19	3,398
1,000 to 2,499	90	18	138,470	29	1,539
500 to 999	54	11	36,452	8	675
100 to 499	123	24	29,280	6	238
less than 100	195[1]	39	11,596	2	59
Total	505	100	475,369	100	941

[1] Approximate.

For this reason, we can expect fewer, but, on the average, larger sawmills in West Virginia in the future.

Sawmilling today is much as it was at the turn of the century. After the boom in lumber production an excess of mills stifled the advance of improved technology in sawmilling and depressed the average production of the State's sawmills. In 1965 the average sawmill in West Virginia produced 941 thousand board feet per year. Except for 1942 this is the lowest average production for any year for which we have estimates of total lumber production and the number of mills. By comparison, in 1916 the average production of sawmills reached its peak of 2,125 thousand board feet (fig. 6).

Sawlog Production

All sawmill operators listed in the *Directory of sawmill operators in West Virginia, 1963* were sent a questionnaire.[5] Mills producing less than 100 thousand board feet per year were sam-

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[5] This list was updated by personnel of the Division of Forestry of the West Virginia Department of Natural Resources and by the State Extension Forester.

THOUSAND
BOARD
FEET

Figure 6.—Average annual production of sawmills in West Virginia for selected years.
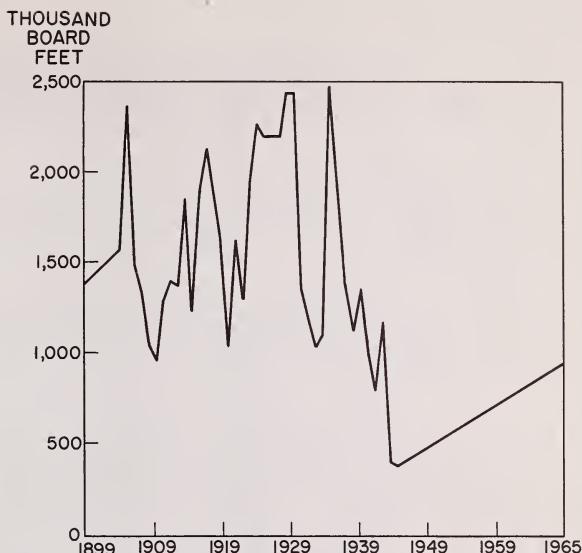
pled lightly because they account for a very small portion of the State's lumber production.

A 100-percent field follow-up was made of all nonrespondent sawmills listed in the directory as sawing more than 1 million board feet annually. A sample of nonrespondent smaller mills was made also.

The questionnaire was used to solicit the total sawlog receipts of the mills by species and by county in which the logs were harvested. Also, data on the use, or non-use, of sawmill residues were gathered by means of the questionnaire.

In 1965 West Virginia produced nearly 491 million board feet of sawlogs (table 10). This is the highest production since 1943 when production was spurred by the war.

Of this total nearly 96 percent was hardwoods. Red oak accounted for nearly 29 percent of the 470 million feet of hardwood sawlogs produced. Yellow-poplar and white oak accounted for 19 and 11 percent, respectively, of the hardwood production (table 11).

The Southern Geographic Unit produced 46 percent—227 million board feet—of the State's sawlogs. Wyoming County, in the Southern Geographic Unit, produced more sawlogs than any other county—51,661.4 thousand board feet, or better than 10

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Table 10. — *Production of sawlogs in West Virginia by species and geographic units, 1965*
(Thousand board feet)*

Species	Northern unit		Southern unit		Northwestern unit		State total
	Eastern panhandle subunit	Western subunit	Eastern subunit	Western subunit	Northern subunit	Southern subunit	
Softwoods:							
Yellow pine	3,128.4	281.0	192.8	537.0	114.7	301.8	4,555.7
White pine	1,687.5	12.0	3,140.1	710.0	31.3	16.7	5,597.6
Other softwoods	1,406.4	2,494.3	2,106.6	3,737.9	53.2	271.9	10,070.3
Total softwoods	6,222.3	2,787.3	5,439.5	4,984.9	199.2	590.4	20,223.6
Hardwoods:							
Ash	452.5	1,792.9	1,087.4	1,547.4	290.5	173.3	5,344.0
Basswood	1,103.5	7,209.1	4,250.0	6,006.1	211.2	1,032.1	19,812.0
Birch	451.5	3,210.5	2,636.0	306.2	5.3	4.7	6,614.2
Beech	1,235.6	9,193.3	7,687.3	5,180.5	163.3	1,909.5	25,369.5
Gum	110.3	753.0	1,080.3	1,683.4	65.8	55.0	3,747.8
Hickory	1,507.2	2,891.1	7,409.0	8,789.8	399.7	2,361.4	23,358.2
Maple, hard	5,271.7	19,700.3	11,464.9	6,847.1	811.0	375.7	44,470.7
Maple, soft	2,146.1	4,867.9	2,887.1	1,507.4	254.2	162.3	11,825.0
Oak, white	8,926.0	7,176.5	13,990.5	16,905.6	2,232.4	3,866.9	53,097.9
Oak, chestnut	3,988.8	3,635.4	4,866.6	5,741.5	770.3	675.7	19,678.3
Oak, red	21,880.4	26,203.8	33,320.2	25,601.6	10,594.5	16,790.0	134,390.5
Black cherry	4,542.0	8,948.3	4,675.7	281.2	1,020.0	18.2	19,485.4
Yellow-poplar	13,096.9	24,175.8	17,157.6	20,154.2	6,936.4	7,165.4	88,686.3
Walnut	883.8	317.2	263.8	722.3	341.5	1,296.7	3,825.3
Other hardwoods	4,078.2	2,601.3	2,141.8	758.7	369.5	839.6	10,789.1
Total hardwoods	69,674.5	122,676.4	114,918.2	102,033.0	24,465.6	36,726.5	470,494.2
Total, all species	75,896.8	125,463.7	120,357.7	107,017.9	24,664.8	37,316.9	490,717.8

* International ¼-inch rule.

(Thousand board feet)*

County	Softwood	Hardwood	All species
NORTHERN UNIT			
Eastern subunit			
Berkeley	463.7	2,632.5	3,096.2
Grant	1,870.5	7,496.7	9,367.2
Hampshire	369.2	5,278.2	5,647.4
Hardy	1,035.1	597.5	1,632.6
Jefferson	—	1,220.8	1,220.8
Mineral	463.6	8,239.3	8,702.9
Morgan	87.2	5,458.8	5,546.0
Pendleton	1,369.0	1,880.1	3,249.1
Preston	53.7	27,894.4	27,948.1
Tucker	510.3	8,976.2	9,486.5
Total	6,222.3	69,674.5	75,896.8
Western subunit			
Barbour	66.9	9,764.1	9,831.0
Braxton	83.0	7,018.6	7,101.6
Harrison	—	360.0	360.0
Lewis	50.0	2,336.0	2,386.0
Pocahontas	1,500.6	16,730.1	18,230.7
Randolph	579.8	42,900.0	43,479.8
Taylor	15.0	3,946.0	3,961.0
Upshur	—	8,832.3	8,832.3
Webster	492.0	30,789.3	31,281.3
Total	2,787.3	122,676.4	125,463.7
Unit total	9,009.6	192,350.9	201,360.5
SOUTHERN UNIT			
Eastern subunit			
Clay	521.2	9,520.6	10,041.8
Fayette	267.5	21,530.6	21,798.1
Greenbrier	802.6	43,020.1	43,822.7
Mercer	365.4	5,044.2	5,409.6
Monroe	633.5	5,884.7	6,518.2
Nicholas	571.7	25,027.7	25,599.4
Summers	2,277.6	4,890.3	7,167.9
Total	5,439.5	114,918.2	120,357.7

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Table 11 — *continued*

County	Softwood	Hardwood	All species
Western subunit			
Boone	201.0	9,561.6	9,762.6
Kanawha	309.1	11,761.9	12,071.0
Logan	5.3	4,399.4	4,404.7
McDowell	1,075.2	8,045.1	9,120.3
Mingo	240.8	7,647.8	7,888.6
Raleigh	121.3	11,988.0	12,109.3
Wyoming	3,032.2	48,629.2	51,661.4
Total	4,984.9	102,033.0	107,017.9
Unit total	10,424.4	216,951.2	227,375.6

NORTHWESTERN UNIT

	Softwood	Hardwood	All species
Northern subunit			
Brooke	—	—	—
Doddridge	—	2,938.7	2,938.7
Hancock	—	—	—
Marion	13.2	2,645.8	2,659.0
Marshall	—	911.7	911.7
Monongalia	5.0	6,878.0	6,883.0
Ohio	—	—	—
Pleasants	—	—	—
Ritchie	32.9	2,261.6	2,294.5
Tyler	—	558.2	558.2
Wetzel	6.8	6,651.1	6,657.9
Wood	141.3	1,620.5	1,761.8
Total	199.2	24,465.6	24,664.8
Southern subunit			
Cabell	21.3	741.9	763.2
Calhoun	—	2,796.7	2,796.7
Gilmer	4.5	2,208.1	2,212.6
Jackson	2.4	1,084.0	1,086.4
Lincoln	12.0	8,361.9	8,373.9
Mason	201.7	909.5	1,111.2
Putnam	—	269.6	269.6
Roane	42.6	7,874.2	7,916.8
Wayne	220.7	9,240.6	9,461.3
Wirt	85.2	3,240.0	3,325.2
Total	590.4	36,726.5	37,316.9
Unit total	789.6	61,192.1	61,981.7

* International ¼-inch rule.

SAWLOG PRODUCTION,
MILLION BOARD FEET
☐ LESS THAN 1
☐ 1 TO 4
▨ 5 TO 9
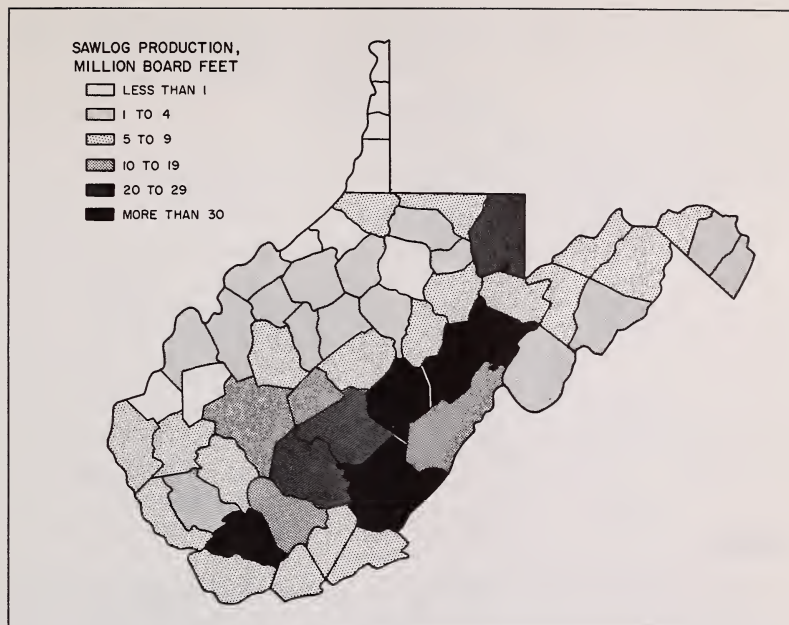▨ 10 TO 19
■ 20 TO 29
■ MORE THAN 30

Figure 7.—Sawlog production in West Virginia, 1965, by counties.

percent of the State's total. Greenbrier and Randolph Counties each produced nearly 9 percent of the State's total (figs. 7 and 8).

Interstate
Sawlog Shipments

In 1965 West Virginia shipped a greater volume of sawlogs out of the State for manufacture into lumber than it received. Five states—Virginia, Pennsylvania, Maryland, Ohio, and Kentucky—received a total of over 15 million board feet of sawlogs from West Virginia. Pennsylvania received more than any other state—nearly 12 million board feet. On the other hand, West Virginia received nearly 10 million board feet from these same states. More wood was shipped into West Virginia from Maryland than from any other state—4 million board feet. Thus, West Virginia showed a net shipment out of state of nearly 6 million board feet of sawlogs in 1965.
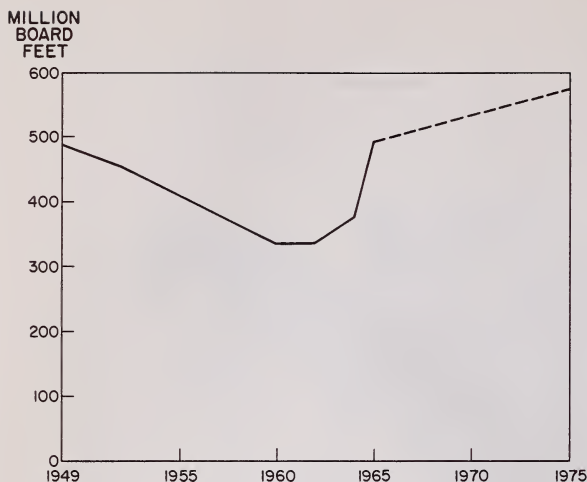
Figure 8.—Trend of saw-log production in West Virginia.

Value

The stumpage price is the price paid to the timber owner for standing timber by the individual who intends to harvest it. The harvester or logging contractor then receives a price from the sawmill operator when he delivers the logs to the mill. This is called the delivered price.

Based on a weighted average price for each species, the total stumpage value of sawlogs produced in West Virginia in 1965 was $9,400,000. The delivered value of these logs was $27,110,000 (table 12).

Both stumpage and delivered prices vary considerably by species. Stumpage prices in 1965 ranged from as low as $2 per thousand board feet for beech to a high of $60 or more per thousand board feet for black cherry, black walnut, and red oak. The average stumpage price paid was $20.17 per thousand board feet. Delivered prices show a similar range, from a low of $18 for beech to a high of $164 for black walnut. The average delivered price of sawlogs was $57.15 per thousand board feet.

Projected Sawlog Production

Sawlog production fell from 470 million board feet in 1949 to 320 million board feet in 1960 and then gained sharply from

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Table 12. — *Estimated stumpage value and estimated value delivered to the mill of sawlogs cut in West Virginia, by geographic unit, 1965*

(In thousands of dollars)

Geographic unit and subunit	Estimated stumpage value	Estimated value delivered to the mill
Northern unit:		
Eastern panhandle subunit	$1,537	$4,399
Western subunit	$2,254	$7,105
Southern unit:		
Eastern subunit	$2,403	$6,574
Western subunit	$1,986	$5,709
Northwestern unit:		
Northern subunit	$ 504	$1,351
Southern subunit	$ 716	$1,972
State total	$9,400	$27,110

[1] These estimated values were calculated by applying the weighted average price of various species to the sawlog cut for each geographic subunit. Prices were calculated using the West Virginia Forest Products Marketing Information Bulletins Vol. 6, Nos. 1, 2, and 3, published by the West Virginia Department of Agriculture.

1960 to 1965. Over these 16 years the net increase has been about 0.25 percent per year.

To assume that this 0.25 percent overall trend is the actual trend for projection purposes would result in an overly conservative projection. On the other hand, to assume that the nearly 9 percent annual rate experienced between 1960 and 1965 is the actual rate would result in an over-enthusiastic projection. Because sawlog production in West Virginia has increased at a faster rate than the approximate 1 percent national rate of growth, we have selected a 1.5 percent annual rate of increase that we feel is realistic in the long run. Based on this 1.5 percent rate, sawlog production can be expected to reach 529 million board feet by 1970 and 570 million board feet by 1975. The sawtimber supply in West Virginia will probably be sufficient to meet this demand.

VENEER

A 100-percent canvass of veneer log brokers and buyers was made using the same questionnaire sent to sawmill operators.

Production

The veneer industry in West Virginia is small. In 1965 the total production of veneer logs in West Virginia was 4,601 thousand board feet, down from 6,982 thousand board feet in 1963 (figs. 9 and 10).

The most commonly utilized species for veneer was yellow-poplar—1.4 million board feet; the second most commonly used was red oak—1.1 million board feet; and third was hickory—0.7 million board feet.

Figure 9.—Veneer is trimmed after being sliced. In 1965 West Virginia veneer manufacturers consumed nearly 6.4 million board feet of veneer logs.

Table 13.— Veneer logs cut in West Virginia, by species and by state or country of manufacture, 1965

(Thousand board feet)

Species	Cut in West Virginia	Processed in:						Total exported
		West Virginia	Indiana	Ohio	Pennsylvania	Virginia	Canada	
Ash	99	11	—	—	—	87	1	88
Basswood	241	241	—	—	—	—	—	—
Elm	28	—	—	28	—	—	—	28
Gum	11	—	—	11	—	—	—	11
Hickory	695	549	100	—	—	46	—	146
Maple, hard	34	34	—	—	—	—	—	—
Maple, soft	23	23	—	—	—	—	—	—
Oaks, white	131	64	—	—	—	40	27	67
Oak, chestnut	4	—	—	—	—	—	4	4
Oak, red	1,146	287	—	—	756	103	—	859
Black cherry	43	40	—	—	3	—	—	3
Yellow-poplar	1,439	1,168	—	230	—	41	—	271
Walnut	636	70	3	517	—	11	35	566
Other	71	14	—	57	—	—	—	57
Total, all species	4,601	2,501	103	843	759	328	67	2,100

Nearly 46 percent of the veneer logs produced in West Virginia is shipped to other states and countries for manufacture into veneer. However, West Virginia veneer manufacturers more than replace these exported logs with logs received from other states. Thus, while West Virginia cut 4,601 thousand board feet in 1965 and shipped 2,100 thousand board feet out of the State (table

MILLION
BOARD
FEET

Figure 10.—Veneer log production in West Virginia, 1949-65.

13), West Virginia veneer manufacturers received 3,852 thousand feet of logs from other states to make the State's total veneer log consumption 6,353 thousand board feet (table 14). This phenomenon of relatively large cross-boundary movement happens because veneer plants generally specialize in particular types of veneers and in particular species; therefore veneer logs frequently move considerabe distances and often through several dealers and handlers before they finally are converted into veneers.

Value

Prices for veneer-quality logs vary substantially with the species and the quality of the logs. Stumpage prices range from under $100 per thousand board feet for species like yellow- poplar to over $900 for top-quality black walnut logs. Generally speaking, one could use $100 per thousand board feet as an average for all species except black walnut, black cherry, and white oak. These last two bring up to $175 per thousand board feet, and black walnut prices average about $800. Because prices vary greatly and detailed price quotations are lacking, an estimate of the stumpage or delivered log value of the West Virginia veneer log harvest was not made.

Because the industry is erratic we did not attempt to project the future production of veneer logs. However, the forest survey

Table 14. — *Veneer log consumption in West Virginia by species, produced from logs cut in and out of state, 1965*

(Thousand board feet)

Species	Total	Logs cut in West Virginia	Logs cut in other states
Ash	103	11	92
Basswood	264	241	23
Elm	—	—	—
Gum	—	—	—
Hickory	1,855	549	1,306
Maple, hard	34	34	—
Maple, soft	23	23	—
Oaks, white	371	64	307
Oak, chestnut	—	—	—
Oak, red	1,437	287	1,150
Black cherry	468	40	428
Yellow-poplar	1,454	1,168	286
Walnut	289	70	219
Other	55	14	41
Total, all species	6,353	2,501	3,852

of West Virginia (1961) reports 11,877 million board feet of hardwoods in trees 17 inches d.b.h. and larger and 2,861 million board feet of hardwood in grade-1 standard-lumber logs.[1] Although not all of this material is veneer-log quality or is available to veneer manufacturers, we can reasonably conclude that the production of veneer logs could be increased substantially in West Virginia.

COOPERAGE

A 100-percent canvass of all known producers of cooperage stock and a 100-percent field follow-up of all nonrespondents were conducted.

The cooperage industry in West Virginia consumed less than 1 percent of the 1965 timber harvest and only 8 percent of the white oak harvest. The industry is erratic (fig. 11 and table 15).
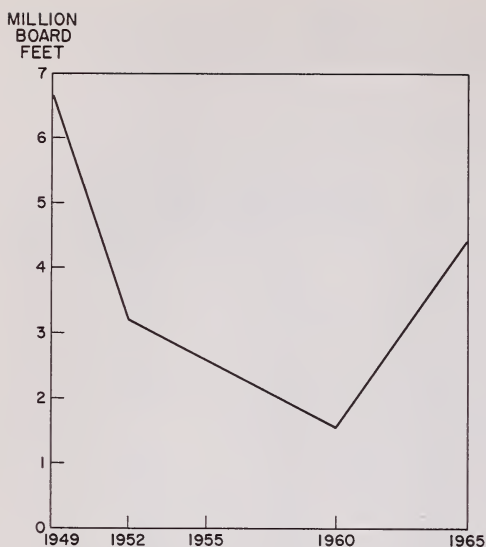
MILLION
BOARD
FEET

Figure 11. — Cooperage log and bolt production in West Virginia, 1949-65.

In 1965 the reported production of cooperage logs and bolts was 4.4 million board feet. All this material was white oak for tight cooperage. Because this industry requires high-quality material, the average value of 1 thousand board feet of cooperage quality logs and bolts delivered to the mill is estimated at $130. Thus the total value of cooperage material produced in West Virginia in 1965 was estimated to be $575,380,[6] delivered to the mill (fig. 12).

The forest survey of West Virginia indicates that at that time there were 1,032 million board feet of white oak in trees 17 inches d.b.h. or larger in the State.[1] Although more exact figures are not available, two-thirds or more of this volume is estimated to be of acceptable cooperage quality. This volume, nearly 700 million board feet, is scattered throughout the State. And of course not all of it will be consumed by cooperage mills. Other industries, like veneer mills and lumber mills, compete with

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[6] This estimated price was calculated by taking the weighted average of #1, #2, and heading bolts as reported by the West Virginia Department of Agriculture in WEST VIRGINIA FOREST PRODUCTS MARKETING INFORMATION Vol. 6, Nos. 1, 2, and 3.

cooperage mills for this material. However, a sufficient volume of cooperage material probably will be available in West Virginia to meet and exceed current and prospective demands.

Table 15. — *Cooperage log and bolt production in West Virginia, 1949-1965*

(Thousand board feet)

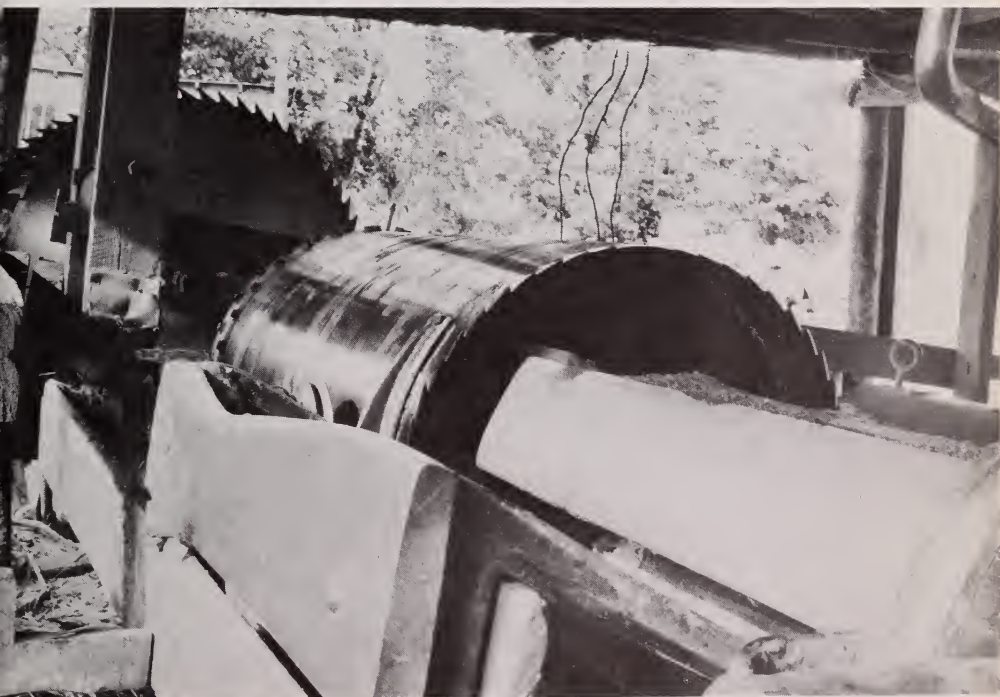| Year	Softwood	Hardwood	Total
1949	—	6,700	6,700
1952	—	3,192	3,192
1960	—	1,550	1,550
1965	—	4,426	4,426

Figure 12.—A white oak stave leaves the saw. In 1965 West Virginia produced $575,380 worth of white oak cooperage bolts for the tight cooperage industry.

PULPWOOD

Pulpwood data were compiled as part of the annual canvass of pulpwood production in the 14 states of the Northeast. This canvass of woodpulp mills solicits the amount of pulpwood received at mills by the county in which it was cut and by species. Also included in this canvass is the amount of wood chips produced for woodpulp and the volume of miscellaneous wood-industry residues used in woodpulp manufacture by state. The results of this canvass for the entire 14 states of the Northeastern area are published annually by the Northeastern Forest Experiment Station.[7]

In 1965 the production of round pulpwood in West Virginia totaled 319,300 cords (fig. 13). Of this total 32 percent was softwood and 68 percent hardwood (tables 16 and 17). This amount put West Virginia in fourth place among the 14 North-

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[7] Kingsley, Neal P. PULPWOOD PRODUCTION IN THE NORTHEAST, 1963. U. S. Forest Serv. Resource Bull. NE-3. 26 pp., illus. NE. Forest Exp. Sta., Upper Darby, Pa. 1966.

Kingsley, Neal P. PULPWOOD PRODUCTION IN THE NORTHEAST, 1964. U. S. Forest Serv. Resource Bull. NE-5. 27 pp., illus. NE. Forest Exp. Sta., Upper Darby, Pa. 1967.

Kingsley, Neal P. and David R. Dickson. PULPWOOD PRODUCTION IN THE NORTHEAST, 1965. U. S. Forest Serv. Resource Bull. NE-6. 36 pp., illus. NE. Forest Exp. Sta., Upper Darby, Pa. 1967.
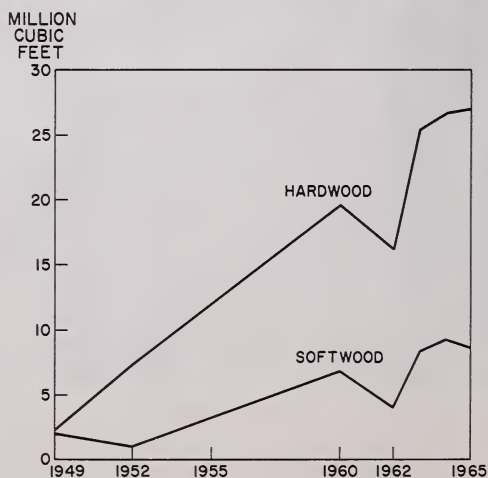

Figure 13.—Round pulpwood production in West Virginia, 1949-65.

Table 16.— Round pulpwood production in West Virginia by geographic units and subunits, and by species group, 1965

(In rough cords)

Geographic unit	Spruce and fir	Hemlock-tamarack	Pines	All softwoods	Aspen-yellow-poplar	Oak-hickory	Other hardwoods	All hardwoods	Total
Northern:									
Eastern subunit	—	—	66,900	66,900	5,200	68,100	58,200	131,500	198,400
Western subunit	—	100	1,400	1,500	500	4,500	9,600	14,600	16,100
Total	—	100	68,300	68,400	5,700	72,600	67,800	146,100	214,500
Southern:									
Eastern subunit	100	1,100	6,000	7,200	900	2,900	61,800	65,600	72,800
Western subunit	—	—	100	100	—	—	500	500	600
Total	100	1,100	6,100	7,300	900	2,900	62,300	66,100	73,400
Northwestern:									
Northern subunit	—	—	6,500	6,500	—	500	1,200	1,700	8,200
Southern subunit	—	—	20,100	20,100	100	1,200	1,800	3,100	23,200
Total	—	—	26,600	26,600	100	1,700	3,000	4.800	31,400
State total	100	1,200	101,000	102,300	6,700	77,200	133,100	217,000	319,300

Table 17.— *Round pulpwood production in West Virginia by geographic units and counties, and by species groups, 1965*

(Thousand rough cords)

County	Softwoods				Hardwoods				All species
	Spruce-fir	Hemlock-tamarack	Pine	Total	Aspen-yellow-poplar	Oak-hickory	Other	Total	

NORTHERN GEOGRAPHIC UNIT

Eastern subunit

County	Spruce-fir	Hemlock-tamarack	Pine	Total	Aspen-yellow-poplar	Oak-hickory	Other	Total	All species
Berkeley	—	—	9.2	9.2	—	2.1	0.3	2.4	11.6
Grant	—	—	4.3	4.3	1.3	12.1	11.0	24.4	28.7
Hampshire	—	—	20.6	20.6	1.6	16.7	14.8	33.1	53.7
Hardy	—	—	10.0	10.0	.1	10.6	10.5	21.2	31.2
Jefferson	—	—	.2	.2	*	.1	.1	.2	.4
Mineral	—	—	5.5	5.5	1.4	13.9	12.6	27.9	33.4
Morgan	—	—	13.2	13.2	.1	5.7	1.4	7.2	20.4
Pendleton	—	*	3.7	3.7	.3	2.7	3.8	6.8	10.5
Preston	—	—	—	—	.2	1.8	1.6	3.6	3.6
Tucker	—	—	.2	.2	.2	2.4	2.1	4.7	4.9
Total	—	—	66.9	66.9	5.2	68.1	58.2	131.5	198.4

Barbour	—	—	—	—	—	—	—	—	*
Braxton	—	—	*	*	*	*	*	*	*
Harrison	—	—	*	*	*	*	*	*	*
Lewis	*	0.1	1.3	1.4	0.4	3.4	8.6	12.4	13.8
Pocahontas	*	—	.1	.1	.1	1.1	1.0	2.2	2.3
Randolph	—	—	*	*	*	*	*	*	*
Taylor	—	—	*	*	*	—	—	—	*
Upshur	—	—	—	—	—	—	—	—	—
Webster	—	*	*	*	*	—	—	—	*
Total	—	0.1	1.4	1.5	0.5	4.5	9.6	14.6	16.1
Unit total	—	0.1	68.3	68.4	5.7	72.6	67.8	146.1	214.5

SOUTHERN GEOGRAPHIC UNIT

Eastern subunit

Clay	—	—	—	—	—	—	—	—	—
Fayette	—	—	*	*	*	*	0.2	0.2	0.2
Greenbrier	*	0.5	2.5	3.0	0.4	1.4	32.0	33.8	36.8
Mercer	—	—	—	—	—	—	—	—	—
Monroe	0.1	.6	3.3	4.0	.5	1.2	28.6	30.3	34.3
Nicholas	—	—	.1	.1	*	.3	.2	.5	.6
Summers	*	*	.1	.1	*	*	.8	.8	.9
Total	0.1	1.1	6.0	7.2	0.9	2.9	61.8	65.6	72.8

Table 17 — *continued*

County	Softwoods				Aspen-yellow-poplar	Hardwoods			All species
	Spruce-fir	Hemlock-tamarack	Pine	Total		Oak-hickory	Other	Total	
Western subunit									
Boone	—	*	*	*	*	*	0.5	0.5	0.5
Kanawha	—	—	0.1	0.1	—	*	*	*	.1
Logan	—	—	—	—	—	—	—	—	—
McDowell	—	—	—	—	—	—	—	—	—
Mingo	—	—	—	—	—	*	*	*	*
Raleigh	—	—	—	—	—	—	—	—	—
Wyoming	—	—	—	—	—	—	—	—	—
Total	—	—	0.1	0.1	—	—	0.5	0.5	0.6
Unit total	0.1	1.1	6.1	7.3	0.9	2.9	62.3	66.1	73.4
NORTHWESTERN GEOGRAPHIC UNIT									
Northern subunit									
Brooke	—	—	—	—	—	—	—	—	—
Doddridge	—	—	*	*	*	*	*	*	*
Hancock	—	—	—	—	—	*	*	*	*
Marion	—	—	—	—	—	—	—	—	—

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County									
Marshall	—	—	*	*	—	—	—	—	*
Monongalia	—	—	*	::	—	—	—	—	*
Ohio	—	—	—	—	*	*	*	*	*
Pleasants	—	—	0.2	0.2	*	*	*	*	0.2
Ritchie	—	—	1.7	1.7	*	0.2	0.2	0.4	2.1
Tyler	—	—	—	—	—	—	—	—	—
Wetzel	—	—	—	—	—	—	—	—	—
Wood	—	—	4.6	4.6	*	.3	1.0	1.3	5.9
Total	—	—	6.5	6.5	—	0.5	1.2	1.7	8.2
Southern subunit									
Cabell	—	—	0.3	0.3	—	—	—	—	0.3
Calhoun	—	—	.2	.2	—	*	*	*	.2
Gilmer	—	—	*	*	*	0.1	*	0.1	.1
Jackson	—	—	1.3	1.3	*	.1	0.2	.3	1.6
Lincoln	—	—	*	*	0.1	—	—	—	*
Mason	—	—	6.8	6.8	*	.6	1.2	1.9	8.7
Putnam	—	—	5.6	5.6	—	*	*	*	5.6
Roane	—	—	1.2	1.2	—	.1	.1	.2	1.4
Wayne	—	—	—	—	—	*	*	*	*
Wirt	—	—	4.7	4.7	*	.3	.3	.6	5.3
Total	—	—	20.1	20.1	0.1	1.2	1.8	3.1	23.2
Unit total	—	—	26.6	26.6	0.1	1.7	3.0	4.8	31.4

* Less than 50 cords.

Figure 14. — Debarked pulpwood bolts are conveyed to the chipper before being manufactured into woodpulp. West Virginia is one of the leading pulpwood-producing states in the Northeast.

eastern States. West Virginia led fifth-ranked Ohio by 46,800 cords and fell 51,600 cords behind third-place New York. All of this pulpwood was shipped out of the State, principally to Virginia, Ohio, and Maryland (fig. 14).

The use of wood chips from wood-industry residues, and long logs for pulpwood has grown remarkably in recent years. West Virginia is no exception to this trend. In 1965 West Virginia produced the equivalent of 92,400 cords of wood chips for woodpulp. Thus West Virginia placed second among the 14 states in chip production; Maine was first with 129,700 cords. In 1963 West Virginia's total wood chip production was only 38,600 cords.

Pulpwood production in West Virginia has shown outstanding growth in recent years. The 1965 production of pulpwood was nearly 7 times that of 1949—27,141 thousand cubic feet compared to 4,200 thousand cubic feet (table 18).

Table 18. — *West Virginia pulpwood production, 1949-1965*

(Thousand cubic feet)

Year	Softwoods	Hardwoods	Total
1949	2,000	2,200	4,200
1952	1,028	6,439	7,467
1960	6,972	12,708	19,680
1962	4,095	12,125	16,220
1963	8,483	17,034	25,517
1964	9,316	17,400	26,716
1965	8,696	18,445	27,141

To project pulpwood production in any region is hazardous. The construction of a new mill and abrupt changes in technology, which cannot be foreseen easily, can drastically alter production and make the projection obsolete. However, if we make certain assumptions we can project production in this important industry.

In our projections we made three basic assumptions. First, that West Virginia's total production of pulpwood will continue to have the same relationship to the total production of woodpulp in surrounding states; second, that the 4-percent-per-year decrease in the number of cords required per ton of woodpulp production, which has been evident in recent years, will continue; third, that the timber resource of West Virginia is not a limiting factor in pulpwood production.

Our projections (fig. 15) indicate an annual total production of approximately 675 thousand cords by 1970 and 925 thousand cords by 1975. How much of this total will be in the form of wood chips produced from other wood industry residues is difficult to access. However, based on recent trends, wood chips could conceivably account for 30 percent or more of the total production by 1975.
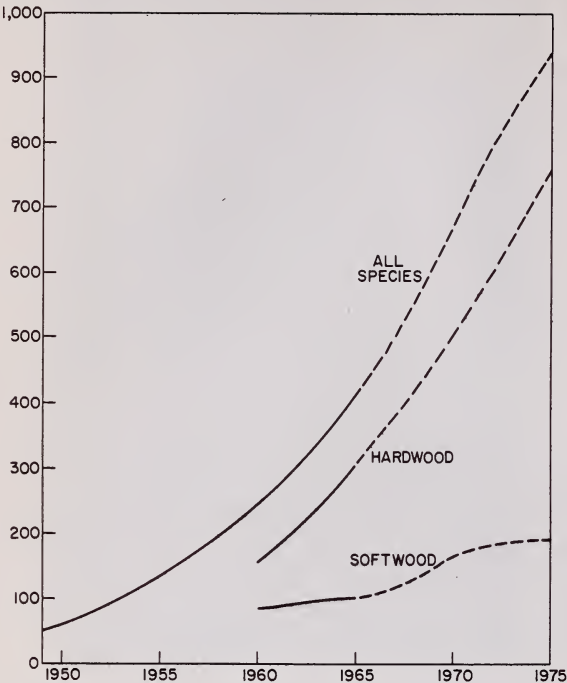
THOUSAND
CORDS

Figure 15. — Pulpwood production in West Virginia from all sources 1949-65, and projection to 1975.

ALL SPECIES

HARDWOOD

SOFTWOOD

POLES

In 1965 West Virginia produced one thousand poles for a total of 12 thousand cubic feet. All this material was softwood. Because the volume of this material is insignificant, to establish a value or attempt a projection of future production would be meaningless.

This estimate was developed by using a 100-percent canvass of all known procedures of poles and a 100-percent field follow-up of all non-respondents.

MINE TIMBERS

Because mine-timber production is sporadic and highly fragmented in West Virginia, a complete list of mine-timber producers for use in a mail canvass could not be compiled (fig. 16). Therefore a set of factors for estimating the use of round, split, and

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hewn mine timbers (mine props) per ton of coal were applied to underground mine production in each county in 1965.[8] The factors, 0.00669 cubic feet of softwood and 0.07534 cubic feet of hardwood per ton, were developed from a 1962 study of wood used in mines.

We had to make two assumptions: first, that these factors had not significantly changed from 1962 to 1965; and second, that mine-timber production in any county is fairly well correlated with coal production from underground mines in the county. Where this correlation was weak, we further assumed that these weaknesses would be minimized by grouping counties.

The production of round, hewn, and split mine timbers in West Virginia totaled just over 11 million cubic feet in 1965. Only 898 thousand cubic feet of this material was softwood (table 19). In addition to the 11 million cubic feet of round, hewn, and spilt mine timbers, West Virginia's underground mines also used 4 million cubic feet of lumber, sawed ties, and timbers.

At an average stumpage price of 5.5 cents per piece or $4.40 per cord, the 11 million cubic feet of mine props was worth $605,000 to landowners. The value of this material delivered to

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[8] West Virginia Department of Mines Annual Report, 1965, p. 129.

Figure 16.—Many sawmills like this one produce mine timbers and ties as well as lumber.

Table 19. — *Round, hewn, and split mine timber production, by softwoods and hardwoods, and coal production from underground mines in West Virginia, 1965*

Geographic unit and subunit	Coal production[1] from underground mines	Softwoods	Hardwoods	Total
	Tons		Thousand cubic feet	
Northern:				
Eastern panhandle subunit	4,228,781	28.2	318.6	346.8
Western subunit	10,723,547	71.7	807.8	879.5
Southern:				
Eastern subunit	15,071,712	100.8	1,135.5	1,236.3
Western subunit	75,494,903	504.9	5,687.7	6,192.6
Northwestern:				
Northern subunit	27,499,942	184.0	2,071.8	2,255.8
Southern subunit	1,233,459	8.3	93.0	101.3
Total, all units	134,252,344	897.9	10,114.4	11,012.3

[1] West Virginia Department of Mines annual report, 1965.

the mines was estimated at $892,000.30, an average price of 8.1 cents per cubic foot or $6.48 per cord.[9]

The production of mine props generally can be expected to follow the trend of the production of coal from underground mines. This segment of the coal-mining industry has shown moderate increases in recent years. Thus if present trends continue, round, split, and hewn mine-timber production can be expected to approach 15 million cubic feet by 1970 and to be between 18 and 19 million cubic feet by 1975.

CHARCOAL

The charcoal industry in West Virginia consists of seven operating plants. Six of these plants consume an estimated 76,800 cords of wood (fig. 17). Of this material 62,300 cords is round-wood and 14,500 cords is sawmill residues, principally slabs and edgings. The seventh firm produces charcoal from wood bark,

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[9] This estimated price was calculated by taking the weighted average prices of various sizes of mine props as reported by the West Virginia Department of Agriculture in WEST VIRGINIA FOREST PRODUCTS MARKETING INFORMATION, Vol. 6, Nos. 1, 2, and 3.
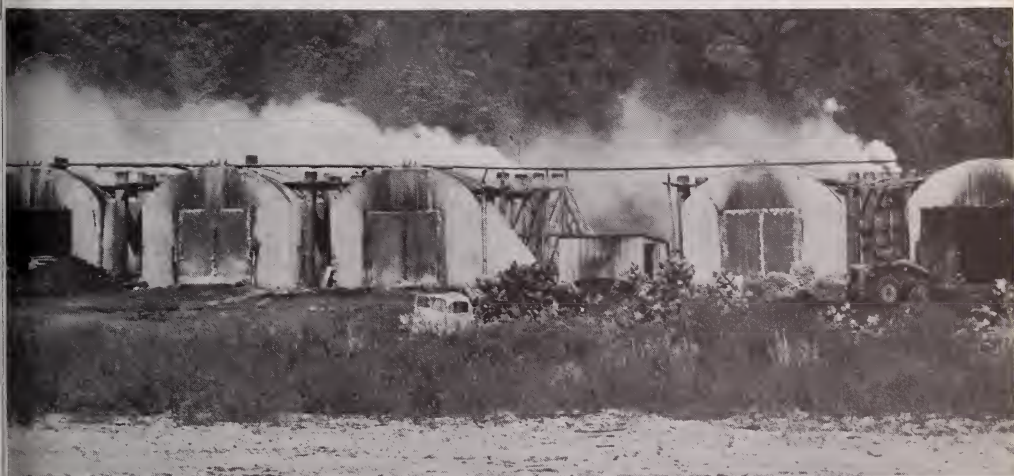

Figure 17.—Charcoal kilns in operation. In 1965 the West Virginia charcoal industry consumed nearly 77 thousand cords of wood.

and its production is not included in the totals. Most of West Virginia's charcoal plants produce raw charcoal, but two of them also produce charcoal briquettes. The wood and residues consumed by West Virginia's charcoal plants are valued at $644,700 delivered to the plant.

This estimate of charcoal production was developed by consultation with several people who are familiar with the industry in West Virginia.

FENCING

Rustic Fencing

The rustic fencing industry in West Virginia consists of 13 firms. The mail canvass of these producers showed that in 1965 they produced 246 thousand posts and 477 thousand rails. This volume amounts to 990 thousand cubic feet (table 20).

The most commonly used species is dead American chestnut (*Castanea dentata*)—534 thousand cubic feet (fig. 18). This is material cut from trees killed by the chestnut blight that swept through the range of the American chestnut. The second most commonly used species is black locust—295 thousand cubic feet. Sassafras is the third commonly used species—147 thousand cubic feet. This species is considered a noncommercial species because it seldom reaches sufficient size for most commercial uses. Recently some red spruce has been used for rustic fencing—14 thousand cubic feet.

Table 20. — *Rustic fencing production in West Virginia, by species, 1965*

Species	Posts	Rails	Total	Posts	Rails	Total
	Thousand pieces			*Thousand cubic feet*		
Spruce	8	—	8	14	—	14
Sassafras	36	72	108	61	86	147
Black locust	72	144	216	122	173	295
Chestnut	130	261	391	221	313	534
Total, all species	246	477	723	418	572	990

Figure 18.—A truckload of chestnut fence posts and rails. Fifty-four percent of the timber cut for rustic fencing in West Virginia in 1965 was blight-killed American chestnut.

Because the chestnut used in rustic fencing is dead and the sassafras is considered a noncommercial species, no more than 309 thousand cubic feet could have been cut from growing-stock material. Of this 309 thousand cubic feet it is doubtful that more than 75 percent was cut from trees 5 inches d.b.h. and larger. Therefore, in all probability, out of 990 thousand cubic feet, only about 230 thousand cubic feet were removed from growing stock.

Much of the material used to manufacture rustic fencing is cut by farmers and other rural residents during slack periods. For this reason prices for fencing material are quoted two ways—at the farm and delivered. The at-the-farm price differs from stumpage price because the material already has been cut and is just awaiting delivery to the manufacturer. In 1965 the at-the-farm price for rails was 27 cents per piece, and for posts 26 cents per piece. At these prices the total at-the-farm value of this material

was $190,440. Delivered prices were 32 cents for rails and 49 cents for posts. At these prices the delivered value of the material was $312,450.

Because past production data on rustic fencing are scarce we cannot project the future of this industry. However, it does appear certain that the rustic-fencing industry in West Virginia cannot continue to grow unless the consumer will accept rustic fencing made with species other than chestnut.

Other Fencing

In addition to the 990 cubic feet of rustic fence material, West Virginia also produced 1,679 thousand cubic feet of posts for other purposes. These are principally fence posts for farm use. If one assumes the same value as for rustic fence posts, the value of this production is $302,120 at the farm. This estimate of other fencing was developed as part of the fuelwood canvass.

FUELWOOD

A survey to determine the production of fuelwood in any area poses many special problems. Fuelwood production is usually a part-time endeavor, even for those producing fuelwood for sale. Many questions arise about this industry: Who are these producers? How much do they cut from trees that are not on forest land? How much is cut from dead trees or portions of trees that other users will not or cannot utilize? And how much of the wood consumed as fuel is actually residues from other wood-using industries, particularly from sawmill slabs and edgings? For these reasons a door-to-door canvass of randomly selected homes and farms was conducted to develop an estimate of fuelwood production.

This canvass utilized the Master Sample of Agriculture, which is a predetermined segmenting of predominantly rural areas in the United States. A particular size sample of these areas can be selected based on the number of segments and the total of the assigned weights. In West Virginia a total of 32 sample segments was taken. These segments constituted a 0.5-percent sample of the State. This size of sample gave a calculated sampling error of 20 percent for the total. Stated another way, this means that, if the

Table 21. — *Fuelwood production in West Virginia, 1965 from growing stock by species, from nongrowing stock, and from wood industry residues*

Kind of timber	Volume	
	Cords	Thousand cubic feet
FROM GROWING STOCK *(trees 5 inches d.b.h. or larger)*		
Softwoods:		
Yellow pines	1,278	102
White pine	—	—
Other softwoods:	—	—
Total softwoods	1,278	102
Hardwoods:		
Red oaks	6,190	495
White oaks	5,334	427
Yellow-poplar	2,530	202
Hickories	2,195	176
Chestnut oak	1,499	120
Locust	1,111	89
All other hardwoods	7,151	572
Total hardwoods	26,010	2,081
Total, from growing-stock sources	27,288	2,183
FROM NON-GROWING STOCK SOURCES		
Cull trees and limbs over 4 inches d.i.b.	6,595	528
Dead trees	10,263	821
Upper stems and limbs under 4 inches d.i.b. and trees under 5 inches d.b.h.	10,360	828
Noncommercial species and trees from nonforest land	864	69
Total, non-growing-stock sources	28,082	2,246
From wood-industry residues	100,758	8,061
Total from all sources	156,128	12,490

same procedure were repeated, two out of three times the resulting total would be within 20 percent of the original total.

The results of this survey showed that 27,288 cords of growing-stock material and 28,082 cords of non-growing-stock material were used for fuelwood—a total of 55,340 cords of roundwood. In addition to this, 100,758 cords came from wood-industry residues. Of the roundwood 26 percent came from sawtimber-size trees and 74 percent from poletimber-size trees (table 21).

Once a major fuel in rural areas, wood is used less and less for home heating. In many areas, particularly suburban areas, more fuelwood is undoubtedly consumed as a luxury item—fireplace logs—than as household fuel. And in rural areas of West Virginia, fuelwood consumption is low because coal is as cheap as wood and more easily obtained. Undoubtedly fuelwood production will continue to decline in West Virginia. What the rate of this decline will be is in question because the actual production of fuelwood is at best difficult to determine.

The value of fuelwood production is as difficult to assess as production. Substantial quantities of roundwood are produced and consumed without ever changing hands in the market. However, in determining this value one might apply prices for mine timbers. This, at best, undoubtedly would be over-pricing fuelwood's true value. For these reasons no projections of fuelwood production or estimates of its value are given here.

MISCELLANEOUS

In West Virginia miscellaneous industrial wood includes principally turnery stock, handle stock, and miscellaneous farm timbers. In 1965 the production of this miscellaneous wood industry totaled 1,031 thousand cubic feet, all of which was hardwood. Because products and prices vary greatly, we did not attempt either to project future output or to determine the value of this production.

A 100-percent canvass of all known producers of handle stock, turnery stock, and other miscellaneous products, and a 100-percent field follow-up of all nonrespondents in these categories were conducted. The estimate of miscellaneous farm timbers was developed as part of the fuelwood canvass.

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Conclusion

The results of this study indicate that the nadir of West Virginia's timber-products output apparently has been reached, and that the production of the State's forest based industry is rising again. With a base of 11,389,000 acres of commercial forest land—74 percent of the total land area—the woodlands of West Virginia, if wisely managed, will be able to maintain and increase their contribution to the State's economy.

■

Appendix

DEFINITIONS OF TERMS

Forest Area

Forest land area. — This includes: (a) lands that are at least 10 percent stocked with trees of any size and are capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; (b) land from which the trees described in (a) have been removed to less than 10 percent stocking and that has not been developed for other use; and (c) afforested areas. (Forest tracts of less than 1 acre, isolated strips of timber less than 120 feet wide, and abandoned fields and pastures not yet 10 percent stocked with trees are excluded.)

Commercial forest land area. — Forest land that is (a) producing, or physically capable of producing, crops of industrial wood (usually sawtimber); (b) economically available now or prospectively; and (c) not withdrawn from timber utilization through statute, ordinance, or administrative order.

Noncommercial forest land area. — Forest land that is (a) withdrawn from timber utilization through statute, ordinance, or administrative order, but that otherwise qualifies as commercial forest land; or (b) incapable of yielding industrial wood products (usually sawtimber) because of adverse site conditions.

Timber Volume

Growing stock. — Net volume, in cubic feet, of live sawtimber and pole-timber trees (see definitions under "Class of Timber") from stump to a minimum 4-inch top (of central stem) outside bark. Net volume equals gross volume less deduction for rot.

Sawtimber volume. — Net volume in board feet, International $\frac{1}{4}$-inch rule, of merchantable sawlogs in live sawtimber trees. Net volume equals gross volume less deductions for rot, sweep, and other defects that affect use for lumber.

Standard cord. — A unit of measure for stacked wood encompassing 128 cubic feet of wood, bark, and air space. Cord estimates can be derived from cubic-foot estimates by applying a factor of 80 cubic feet of wood (inside bark) per rough cord.

Tree Classes

All trees. — All live sawtimber and poletimber trees, seedlings and saplings, and all live cull trees.

Growing-stock trees. — All live sawtimber trees, poletimber trees, and seedlings and saplings, except cull trees. (See definitions under "Class of Timber.")

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Class of Timber

Sawtimber trees. — Trees of commercial species that: (a) are of the following minimum diameters at breast height — softwoods 9.0 inches and hardwoods 11.0 inches; and (b) contain at least one merchantable sawlog. (A merchantable sawlog is a portion of a live tree that meets the minimum log-grade specifications, as defined under log-grade classification. The sawlog portion is that part of the tree between the stump and the top of the last merchantable sawlog.)

Poletimber trees. — Trees of commercial species that meet regional specifications of soundness and form, and are of the following diameters at breast height; softwoods 5.0 to 9.0 inches; hardwoods 5.0 to 11.0 inches. Such trees will usually become sawtimber trees if left to grow.

Sapling-and-seedling trees. — Trees of commercial species that are less than 5.0 inches in diameter at breast height and of good form and vigor.

Cull trees. — Live trees of sawtimber or poletimber size that are unmerchantable for sawlogs now or prospectively because of defect or rot, or because they are of noncommercial species.

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